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IS 14313 (1995): 70 percent alumina bricks [MTD 15: Refractories]



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भारतीय मानक

70 प्रतिशत एल्यूमिना की ईंटें — विशिष्ट

Indian Standard

70 PERCENT ALUMINA BRICKS —
SPECIFICATION

ICS 91.100.20

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BUREAU OF INDIAN STANDARDS
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FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Refractories Sectional Committee had been approved by the Metallurgical Engineering Division Council.

In general bauxite based high alumina refractories are commonly used in steel ladles. However, with increasing demands for superior grades of refractories to satisfy the stringent operating needs, specially with extensive adoption of BOF continuous casting steel making technologies, the necessity for rationalisation and standardization of high-alumina products has become imperative. This specification will also cater to the needs of cement industry.

Considering cyclic use of lining of a steel ladle, volume consistency and spalling resistance have to be treated at par with slag resistance of these refractories. The bricks with no shrinkage and preferably with slight expansion are desirable. A brick with high volume expansion in the initial stage of use may prove detrimental. Further, a high growth rate of glassy matrix is not desirable, also closer values of t_a and t_e may prove injurious to the performance of the brick.

Keeping such aspects in view, three categories for high alumina refractories have been suggested:

- a) Conventional products based on bauxite, mostly Saurashtra origin.
- b) Products with judicious combination of kyanite, sillimanite, technical alumina and even bauxite.
- c) Products based on high purity synthetic aggregates excluding bauxite.

The specification would be modified in future with adequate inputs on change of thermal expansion on repeated cycles, residual after expansion at t_a value, hot modulus of rupture, slag resistance, permanent linear change after reheating at 1600°C, etc.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

70 PERCENT ALUMINA BRICKS — SPECIFICATION

1 SCOPE

1.1 This standard covers the requirements of high alumina (70 percent minimum) refractories based on bauxite, sillimanite, kyanite, technical alumina, etc.

2 REFERENCES

The following Indian Standards are necessary adjuncts to this standard:

<i>IS No.</i>	<i>Title</i>
1335 : 1979	Methods for direct determination of alumina in refractory materials (<i>first revision</i>)
1387 : 1993	General requirements for the supply of metallurgical materials (<i>second revision</i>)
1527 : 1972	Methods for chemical analysis of high silica refractory materials (<i>first revision</i>)
1528	Methods of sampling and physical tests for refractory materials
(Part 1) : 1980	Determination of pyrometric cone equivalent (PCE) or softening point (<i>second revision</i>)
(Part 2) : 1974	Determination of refractoriness under load (<i>first revision</i>)
(Part 4) : 1974	Determination of cold crushing strength (<i>first revision</i>)
(Part 6) : 1974	Determination of permanent change after reheating (<i>first revision</i>)
(Part 7) : 1974	Methods of sampling and criteria for conformity (<i>first revision</i>)
(Part 8) : 1974	Determination of apparent porosity (<i>first revision</i>)
4041 : 1987	Glossary of terms relating to refractory materials (<i>first revision</i>)

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 4041 : 1987 shall apply.

4 SUPPLY OF MATERIAL

4.1 General requirements relating to the supply of material shall conform to IS 1387 : 1993.

4.2 The refractories shall be compact, of homogeneous texture and free from cracks, voids and other flaws. They shall be burnt evenly through-out, shall have no soft corners and shall have sufficient mechanical strength.

5 DIMENSIONS AND TOLERANCES

Dimensions and its tolerances shall be as agreed to between the purchaser and the supplier.

6 CHEMICAL COMPOSITION

The alumina and iron oxide contents of refractories, when determined in accordance with the methods specified in IS 1335 : 1979 and IS 1527 : 1972 shall be as given in Table 1.

Table 1 Chemical Composition

Constituent	Requirement, Percent			
	Type A	Type B	Type C	
			Grade 1	Grade 2
Alumina (Al_2O_3), <i>Min</i>	70	70	70	70
Iron Oxide (Fe_2O_3), <i>Max</i>	1.0	1.5	3.0	3.5

7 PHYSICAL REQUIREMENTS

The refractories shall comply with the physical requirements specified in Table 2.

8 SAMPLING AND CRITERIA FOR CONFORMITY

For sampling of products and for judging the conformity of the product to this specification, the procedure given in IS 1528 (Part 7) : 1974 shall be followed.

9 MARKING

9.1 Each brick or block shall be clearly marked with the manufacturer's name or trade-mark.

9.2 Standard Marking

The material may also be marked with the Standard Mark.

9.2.1 The use of the Standard Mark is governed by the provisions of Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Table 2 Physical Requirements
(Clause 7)

Sl No.	Characteristic	Requirement				Method of Test (Ref to Part of IS 1528)
		Type A	Type B	Type C		
				Grade I	Grade II	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
i)	Refractoriness under load <i>ta°C, Min</i>	1 530	1 500	1 470	1 450	Part 2
ii)	Pyrometric cone equivalent, standard cone (ASTM) No., <i>Min</i>	36	36	36	36	Part 1
iii)	Cold crushing strength <i>kg/cm², Min</i>	500	500	350	350	Part 4
iv)	Apparent porosity percent, <i>Max</i>	23	23	18-23	23	Part 8
v)	Permanent linear change after reheating at 1 500°C/2 h, percent	±0.5	±0.5	+2.5 <i>Max</i>	+2.5 <i>Max</i>	Part 6

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